Bronchial Division in the Treatment of Pulmonary Tuberculosis

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• **Bronchial division was carried out in seven patients with tuberculosis for whom no other procedure was feasible. Results were good in three cases. Complications developed in another case but the ultimate result was expected to be good. Two patients died. One had spread of disease and recanalization of the bronchus.**

THE USE of bronchial occlusion as treatment for tuberculous cavities was advocated at least 25 years ago, principally by Adams[1] and by Coryllos.[5] In most of the early clinical cases, occlusion was brought about by cauterization.

In 1952, in the German literature Nissen and Lezius[6] reported 16 cases of advanced cavitary tuberculosis treated by bronchial ligation and division. Impressed with the results, Bogush,[2] in Russia, operated on 50 patients and reported the results in 1957. Cavity closure was obtained in 43 cases.

Independently Chamberlain of New York started using bronchial ligation in 1948 and reported on a series of 25 cases in 1960. Chamberlain and McNeill's[4] communication, the most comprehensive to date on the subject, reviews considerable historical and experimental background.

In the present study, bronchial division was used in seven male patients for whom no other surgical procedure was feasible. The results in three of these patients were good. In another the sputum became negative for tubercle bacilli but at last report there was a small residual empyema pocket as a complication of the operation. It was expected to heal. Two patients died. Another had a spread of disease, followed by recanalization of the bronchus, and the sputum remained positive.

In recent personal communications, Chamberlain[3] said that his current results with this operation are running about 50 per cent good. He still does not understand why one patient does exceedingly well and in the next all sorts of complications develop.

Brief case reports of the seven patients operated upon by the author follow. A wide variety of complications were encountered.

CASE 1. A 62-year-old man had a right thoracoplasty for a right apical cavity in 1957 (Figure 1, upper left). The cavity was not closed by the operation (Figure 1, upper right and 1, lower left) and the sputum remained positive. The organisms in this patient had become resistant to the major antituberculosis drugs. Since his respiratory reserve was low and it was feared that resection might entail pneumonectomy, bronchial occlusion was decided upon. The right upper lobe bronchus was divided in August, 1960. The postoperative course was extremely smooth and cultures of sputum and of gastric contents for tubercle bacilli promptly became negative. The cavity disappeared (Figure 1, lower right) and the patient was discharged.

CASE 2. A man of 47 with tuberculosis far advanced when it was discovered in 1959 had a cavity remaining at the right apex after 10 months of chemotherapy. The sputum remained positive on culture and the organisms had lost their susceptibility to the major antituberculosis drugs. On August 30, 1960, the right upper lobe bronchus was divided after the lung had been mobilized extraperiosteally as suggested by Chamberlain. The extraperiosteal space contained air for two months but finally filled with fluid. A few weeks later it contained air again, and it was then realized that a bronchopleural fistula had developed. Drainage of emphysema and a thoracoplasty were carried out. The sputum became negative for tubercle bacilli but a small residual empyemic pocket (which was healing rapidly at the time of this report) remained.

CASE 3. The patient was a man 42 years of age who had advanced silicotuberculosis with bilateral cavitation that had been treated for many years with various antituberculosis drugs. The left side was operated upon first. After extraperiosteal mobilization of the lung, the apical-posterior segmental bronchus was divided. Because of dense scarring and matted silicotic nodes at the hilum, the anterior segmental bronchus could not be reached. The anatomical configuration of the left hilum, of course, makes dissection of the upper lobe bronchus more difficult and hazardous than dissection on the right. The cavity decreased in size only temporarily after

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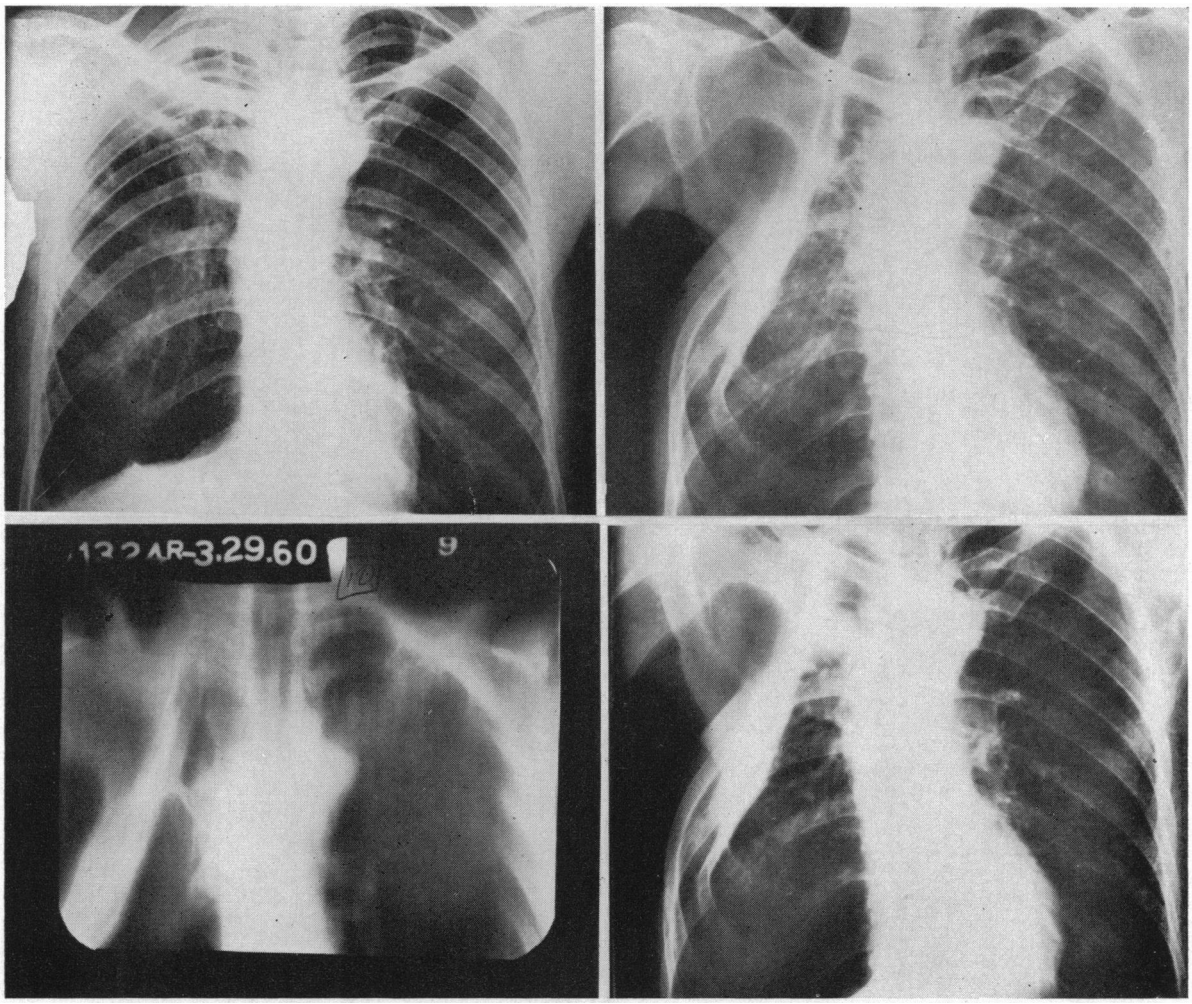

Figure 1.—(Case 1). Picture at upper left, right apical tuberculous cavity for which thoracoplasty was performed in 1957. In the picture at upper right, cavity still present beneath right thoracoplasty. At lower left, the cavity is seen better on a planigram. In roentgenogram at lower right, the cavity is no longer seen after bronchial division. The aerated area beneath the thoracoplasty is emphysematous lung tissue.

the operation. When it again reached its original size, cavernostomy and thoracoplasty were done, reducing the cavity to a narrow sinus. Even though the patient's respiratory reserve was extremely low, division of the right upper lobe bronchus was attempted. During dissection of the hilum which was matted with silicotic nodes, the patient died of uncontrollable hemorrhage from the pulmonary artery.

This case illustrates difficulties that may be encountered in attempting division of the left upper lobe bronchus as well as special hazards associated with silicosis.

CASE 4. The patient, a 35-year-old man, had far advanced, bilateral pulmonary tuberculosis. Although the sputum rather promptly became negative for tubercle bacilli, a large cavity remained at the right apex and there was residual disease throughout the remainder of the lung. Instead of an extrapleural procedure, the right upper lobe bronchus was divided and a three-rib thoracoplasty was carried out. Convalescence was uneventful.

CASE 5. The patient, a 34-year-old Oriental man, with mental disease, had far advanced bilateral tuberculosis (Figure 2) which apparently responded fairly well to chemotherapy, leaving what appeared to be a shrunken, destroyed right upper lobe (Figure 2, upper right and lower left). Thoracotomy was performed with the intention of carrying out right upper lobectomy. However, much more extensive disease was found than was suspected from the roentgenogram. Large dense, caseous lesions involved both the middle lobe and superior segment and extended across the fissures. Instead of carrying out pneumonectomy, or leaving the inferior division of the lower lobe, which would have required an extensive space filling procedure, division

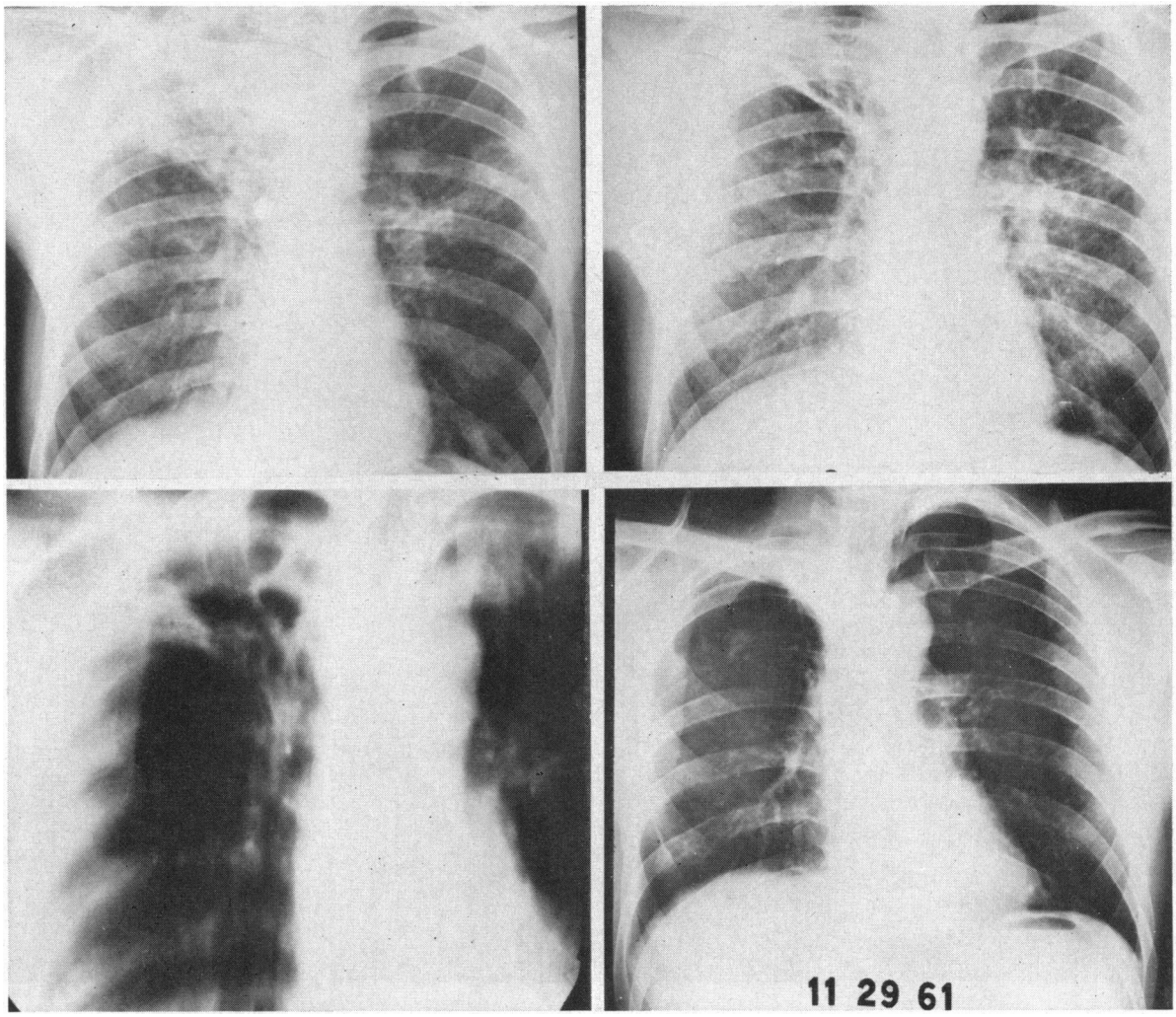

Figure 2.—(Case 5). Picture at upper left is pretreatment roentgenogram showing far advanced bilateral pulmonary tuberculosis. At upper left is a roentgenogram taken after eight months of antituberculosis chemotherapy. The planigram at lower left, taken preoperatively, shows shrunken right upper lobe with cavitation. The picture at lower right is a postoperative roentgenogram taken three months after division of the right upper bronchus and three-rib thoracoplasty.

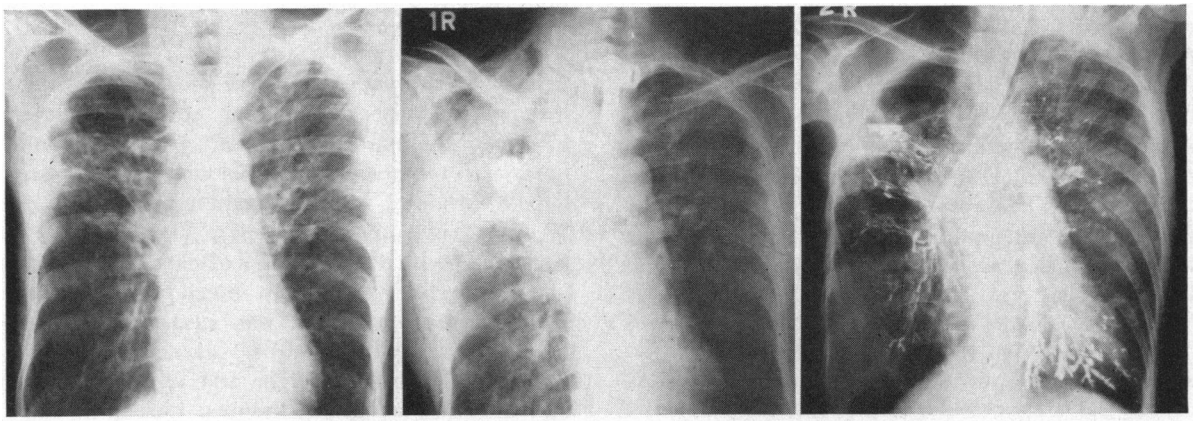

Figure 3.—(Case 6). *Left*, roentgenogram after 11 months of antituberculosis chemotherapy, showing large right apical cavity. *Center*, roentgenogram taken two days after division of the right upper lobe bronchus and three-rib thoracoplasty, showing cavity definitely smaller. A contrast medium had been instilled into the cavity at operation. *Right*, bronchogram taken two months postoperatively, showing cavity much larger and recanalization of the bronchus.

of the right upper lobe bronchus and a three-rib thoracoplasty was decided upon. The postoperative course was smooth and prompt shrinkage of the upper lobe occurred. At last report the sputum was negative on culture.

CASE 6. The patient was an Apache Indian, 30 years of age. After 11 months of treatment with antituberculosis drugs, he had a huge right apical cavity (Figure 3) even though the sputum had become negative. His respiratory reserve was low and he was slightly dyspneic. The right upper lobe bronchus was divided and a small amount of contrast medium (Dionosil®) was instilled through the distal bronchial stump in order that the cavity could be observed roentgenographically. At the same time a three-rib thoracoplasty was done. A film taken on the second postoperative day showed the cavity to be smaller (Figure 3, center). However, the cavity then became progressively larger and a bronchial fistula was demonstrated both by needle aspiration of the cavity and by bronchographic examination (Figure 3, right). The patient died suddenly two and a half months postoperatively from right heart failure with pulmonary edema. At autopsy, the bronchus was found to be recanalized despite the fact that at operation the cut ends had been separated by at least 3 cm.

CASE 7. The patient, a 59-year-old man, had had tuberculosis for many years with known cavitation and postive sputum for at least ten years in spite of the administration of many different antituberculosis drugs. The maximum breathing capacity was 43 liters per minute and the 3-second vital capacity was 55 per cent (normal 94 per cent). The right upper lobe bronchus was divided and a 3-rib thoracoplasty was done. The patient did well for three weeks but then had a massive spread of disease, the lesions involving the middle lobe and the anterior segment of the upper lobe. This cleared later, at least at the base, but cavities reappeared, indicating recanalization of the bronchus. Incidentally, Bogush[2] reported five cases of recanalization although he did not specify as to whether he divided or merely ligated the bronchi in those cases.

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